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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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LSI LOGIC CORPORATION
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EXAMINER

NICOLAS, WESLEY A

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 09/10/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/061,519

Applicant(s)

FANG ET AL.

Examiner

Wesley A. Nicolas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 2.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-15, drawn to a method, classified in class 205, subclass 641.
 - II. Claim 16-20, drawn to a apparatus, classified in class 204, subclass 228.7.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another materially different apparatus such as an apparatus which is used for electroplating instead of electroplanarization.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

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5. During a telephone conversation with Timothy Croll on August 11, 2003, a provisional election was made **without** traverse to prosecute the invention of Group I, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-20 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

7. Claim 14 is objected to because of the following informalities:

Claim 14 indicates "(c)" as coming after "(f)" which is confusing. If Applicant is relying on the letters to indicate step order, they should remain in alphabetical order, otherwise Applicant should remove the letters from the claims.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-2, and 5-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Duboust et al. (U.S. 2003/0136684 A1).

Claim 1 is rejected because Duboust et al. teach a method for controlling a process, wherein a thickness of a conductive material is altered on a surface of a substrate as a part of the process, the method comprising the steps of:

- (a) contacting the substrate with an electrically conductive solution (Fig. 1, numeral 120 and arrows below numeral 170);
- (b) establishing electrical continuity between the surfaces of the substrate and a first electrode (¶'s 0062-0070);
- (c) establishing electrical continuity between the electrically conductive solution and a second electrode (¶'s 0062-0070);
- (d) measuring a value of an electrochemical property between the first electrode and the second electrode (¶'s 0062-0070: measuring voltage or a change in electropolishing current);
- (e) interpreting the value of the electrochemical property as a measure of the electrical conductivity of the surface of the substrate (Fig. 3, "controller"), and
- (f) controlling the process based on the value of the electrochemical property (¶'s 0062-0070: "...which may then issue one or more control signals to initiate additional steps and/or halt the polishing of the substrate").

Claim 2 is rejected because Duboust et al. teach that the electrical conductivity of the surface of the substrate is indicative of the presence of the conductive material on the surface of the substrate (§ 0077: "ohmic resistance" which is inversely proportional to conductivity).

Claim 5 is rejected because Duboust et al. teach that the first electrode comprises a working electrode in a potentiostat system (Fig. 3, numerals 310A or 310B).

Claim 6 is rejected because Duboust et al. teach that the second electrode comprises a reference electrode in a potentiostat system (Fig. 3, numerals 310A or 310B).

Claim 7 is rejected because Duboust et al. teach of establishing electrical continuity between the electrically conductive solution and a third electrode (Fig. 3, numerals 310A or 310B).

Claim 8 is rejected because Duboust et al. teach that the third electrode comprises a counter electrode in a potentiostat system (Fig. 3, numerals 310A or 310B).

Claim 9 is rejected because Duboust et al. teach a method for determining an end point of an electrochemical planarization process, where the electrochemical planarization process includes removing at least a portion of a metal layer from a surface of a substrate submerged in an electrolytic solution, the method comprising:

- (a) providing a first electrode operable to contact the surface of the substrate (§ 0061, and Fig. 3, numeral 202),

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- (b) providing a second electrode operable to contact the electrolytic solution (Fig. 3, numerals 310A or 310B),
- (c) contacting at least the first electrode to the surface of the substrate (Fig. 3, contacting substrate under numeral 130 with electrode 202 and contact coming from numeral 318);
- (d) measuring a change in an electrical property between the first and second electrodes as at least the first electrode contacts the surface of the substrate, the change in the electrical property indicative of a change in conductivity of the surface of the substrate (Π 's 0062-0070 and Π 0077: "ohmic resistance" which is inversely proportional to conductivity), and
- (e) controlling the electrochemical planarization process based on the measured change in the electrical property (Π 's 0062-0070).

Claim 10 is rejected because Duboust et al. teach that step (d) further comprises measuring a change in an electrochemical potential between the first and second electrodes as at least the first electrode contacts the surface of the substrate (Π 's 0062-0070).

Claim 11 is rejected because Duboust et al. teach that step (e) further comprises stopping the planarization process when a substantial increase in the electrochemical potential between the first and second electrodes is measured (Π 's 0062-0070).

Claim 12 is rejected because Duboust et al. teach that step (d) further comprises measuring electrical resistance between the first and second electrodes as at least the first electrode contacts the surface of the substrate (Π 's 0062-0070).

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Claim 13 is rejected because Duboust et al. teach that step (e) further comprises stopping the planarization process when a substantial change in the electrical resistance between the first and second electrodes is measured (¶'s 0062-0070: current flow is inversely proportional to resistance).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 4, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duboust et al. (U.S. 2003/0136684 A1) as applied to claims 1 and 9 above, and further in view of Emesh et al. (U.S. 2002/0108861 A1).

Duboust et al. are as applied, argued, and disclosed above and incorporated herein and further teach:

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- step (a) including providing the first electrode in a first portion of a surface of a pad (Fig. 3, numeral 202);
- step (a) further comprises providing a working electrode of a potentiostat system (Fig. 3, numerals 310A or 310B); and
- step (b) further comprises providing a reference electrode of the potentiostat system (Fig. 3, numerals 310A or 310B).
- (f) providing a brush member in a second portion of the surface of the pad (Fig. 3, numeral 105), the brush member operable to contact the surface of the substrate (Fig. 3, interface between numeral 105 and substrate which is below numeral 130);
- step (c) including contacting the surface of the pad to the surface of the substrate (Fig. 3, interface between numeral 105 and substrate which is below numeral 130); and
- (g) providing relative movement between the surface of the pad and the surface of the substrate as the surface of the pad contacts the surface of the substrate (Fig. 5, rotational arrow of substrate holder 130).

Duboust et al. fail to specifically teach placement of a first electrode spaced apart from a second electrode within the rotating pad that contacts the surface of the substrate.

Emesh et al. teach the use of a plurality of electrodes (Fig. 4, numeral 70 and ¶ 0046) in a polishing pad (*i.e.* platen at Fig. 4, numeral 50).

Claims 4, 14, and 15 are rejected it would have been obvious and within the ordinary skill in the art at the time the invention was made to have modified Duboust et

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al. to use the plurality of electrodes in the polishing pad as taught by Emesh et al. because Emesh et al. teach the use of a plurality of electrodes (Fig. 4, numeral 70 and ¶ 0046) in a polishing pad (*i.e.* platen at Fig. 4, numeral 50) which ensures a uniform potential gradient between the pad (*i.e.* platen) and the substrate (¶ 0047) thereby increasing electromechanical polishing efficiency.

Allowable Subject Matter

13. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The specific step of establishing the electrical continuity between the surface of the substrate and the first electrode intermittently was not taught or suggested by the prior art of record.

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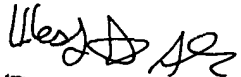
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Roy King whose telephone number is (703) 308-1146.

The fax number for this Group is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.


WESLEY A. NICOLAS
PATENT EXAMINER

September 4, 2003